radiotherapy(CIRT) for Oligo-metastatic tumors located different organ from various cancer.

Material and Methods: From December 2009 to June 2013, 17 patients joined into the clinical study as volunteers. The patients were not surgical candidates for medical reasons or patient refusal. The Oligometastases located in lung,brain and liver respectively from various cancer were treated with CIRT.The heavy ion beams energy was 230~350Mev / u and RBE value was 2.5. A median dose of 60 GyE (range, 20-66 GyE) was delivered to the planning target volume (PTV) in 4-12 fractions with a median daily dose of 5 GyE (range, 4.68-5.5 GyE). Short-term effect was evaluated by tumor change in three months after treatment with *RESIST criteria* and adverse reactions were determined by criteria of acute radiation injury from Radiation Therapy Oncology Group. Treatment outcome was analyzed in terms of local control rate(LCR), survival rate.

Results: In total, 17 patients (7 lung Oligometastases, 3 liver Oligometastases and 7 brain Oligometastases)with 17 Oligo-metastatic lesions were treated with CIRT. Until December 2014, median follow-up period was 18 months(2-40ms). Objective response rate was 94.1% to evaluate short-term effect (3CR, 10PR, 3NC, 1PD) .The 1-year LCR and overall survival of the treated patients were 93.3% and 51.0%. Only 1 lung Oligometastases patients relapsed in 7 months after treatment. 1-year Survival rate were 47.6%,66.7%, 75% respectively in brain, lung and liver Oligometastases. Survival rate and LCR were not significantly correlated with Oligometastases location. All treatment-related complications were acute skin reaction and self-limited, without any grade 4-5 toxicity.

Conclusion: ompared with Conventional radiotherapy, CIRT has short treatment time, high Biological effect advantages. CIRT may be one of effective, the least invasive and safe approach to patients with Oligometastases.

EP-1474

The preliminarily results of carbon ion radiotherapy in 60 patients

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Purpose or Objective: This study summarizes the experience with carbon ion radiation therapy (RT) at the Heavy Ion Research Facility in Lanzhou since 2009.

Material and Methods: From December 2009 to June 2013, 60 patients joined into the clinical study as volunteers. 14 patients with brain tumor〔cerebral glioma(n=6), metastatic brain tumor (n=8)〕,8 patients with head and neck tumor,15 patients with chest tumor〔primary lung cancer (n=8), metastatic mediastinal carcinoma(n=1), metastatic lung cancer(n=6)〕,13 patients with abdominal carcinoma〔primary liver cancer(n=4), pancreatic cancer(n=1), abdominal soft tissue malignant tumor (n=3), metastatic liver cancer(n=4), abdominal lymph node metastasis carcinoma(n=1)〕,5 patients with pelvic tumor〔rectal cancer(n=1), anal cancer (n=1), ovarian carcinoma(n=1), chordoma(n=1), soft tissue tumor(n=1)〕,5 patients with limbs tumor〔skin cancer(n=2), soft tissue malignant tumor(n=3)〕were treated with carbon ions beams. The beams energy was 230~350Mev / u and RBE value was 2.5. A median dose of 60 GyE (range, 20-66 GyE) was delivered to the planning target volume (PTV) in 4-12 fractions with a median daily dose of 5 GyE (range, 4.68-5.5 GyE). Short-term effect was evaluated by tumor change in three months after treatment with *RESIST criteria* and adverse reactions were determined by criteria of acute radiation injury from Radiation Therapy Oncology Group. Treatment outcome was analyzed in terms of local control rate (LCR), survival rate.

Results: Until December 2014, median follow-up period was 18 months (2-40ms). Objective response rate was 98.3% to evaluate short-term effect (9CR, 37PR, 13NC, 1PD) .The 1-year LCR and overall survival of the treated patients were 80.2% and 62.8%. The local control and overall survival rates were not correlated with tumor location and pathological types, the main cause of death was distant metastasis. All treatment related complications were 1-2 grade acute skin reaction (incidence rate = 66.7%) and self-limited, without any grade 4-5 toxicity.

Conclusion: Carbon ion therapy is safe with respect to toxicity , offers high tumor local control rates and significantly shorten the treatment time. But this study has limitations: a group of cancer patients in advanced stage and short survival and follow up time, small sample size and high heterogeneity because of tumor location, clinical stage and pathological type. More homogeneous prospective data, large multicentric and randomized trials are needed to evaluate the efficacy of heavy ion tumor therapy.

EP-1475

Radiotherapy for primary orbital tumors – patterns of care and treatment outcomes

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Purpose or Objective: Although radiation therapy (RT) is widely used in orbital tumors, the clinical use of ophthalmic RT has not been established in the lack of prospective data. This study evaluated the single institution's patterns of care and treatment outcomes of RT in non-metastatic primary tumors and inflammatory diseases in the eye and orbit.

Material and Methods: We retrospectively reviewed a total of 138 patients and 147 treatments of primary orbital malignancies or inflammatory conditions from January 2000 to December 2013. The aims of RT consisted of definitive (n=121), postoperative (n=16), palliative (n=6), and salvage (n=4) treatment. Retrobulbar (34%) and conjunctival (22%) area were the common subsites of treatment. The median external beam RT dose was 30.6 Gy (range, 10.0-66.6) with a daily fraction size ranging from 1.7 to 4.0 Gy. Three-dimensional conformal and intensity-modulated techniques were delivered in 67 (46%) and 5 (3%) treatments, respectively.

Results: Forty-eight (35%) patients had benign inflammatory diseases including thyroid-associated ophthalmopathy (n=24), inflammatory pseudotumor (n=13), and choroidal neovascular membranes (n=11). In 90 (65%) patients with malignant tumors, 13 (9%) patients were children diagnosed with retinoblastoma (n=7), optic glioma (n=4), optic meningioma (n=1), and ocular teratoid medulloepithelioma (n=1). The other 77 (56%) patients were adult with the 5-year overall survival rate of 78.3%. Among the non-pediatric patients, mucosa-associated lymphoid tissue (MALT) lymphoma (n=36) was the most frequent disease entity, and the others also included optic meningioma (n=6), melanoma (n=5), and adenoid cystic carcinoma (n=5). In a total of 81 adult malignant tumors, complete and partial responses were observed in 67 (83%) tumors, and the patients' 5-year relapse-free survival was 60.8%. In the 42 treatments of TAO and inflammatory pseudotumor, inflammatory symptoms were improved in 57%. There were 58 (39%) events of acute toxicities, and grade 1-2 ocular discomfort (n=18) and nausea (n=9) were frequent. Among the 24 (16%) events of late toxicities, 10 (42%) and 2 (8%) events of radiation-induced cataract and retinopathy were observed, respectively. Grade ≥3 toxicities were not reported.

Conclusion: In current practices, the ophthalmic RT achieved an excellent treatment response and tumor control with tolerable short-term and long-term toxicities. Further

analysis with more advanced RT technique is needed to assess the future role of RT in orbital tumors.

EP-1476

General fatigue during the period of radiotherapy; clinical usefulness of Japanese herbal medicine.

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Purpose or Objective: Breast cancer patients receiving post-operative radiotherapy (RT) experience adverse effects and general fatigue is one of them. Although it is often not severe enough to interrupt the course of RT, it negatively affects quality of life. Some Japanese herbal medicines such as TJ-41 (Hochu-ekki-to) are effective for fatigue and are often used in daily practice. The purpose of this study is to assess radiation-induced fatigue (RIF) in detail and investigate the effect of Japanese herbal medicine.

Material and Methods: Breast cancer patients who received post-operative RT and agreed to answer a patient self-reporting questionnaire (FACIT-F; Functional Assessment of Chronic Illness Therapy) were eligible for this study. We excluded patients who were receiving chemotherapy concurrently. RIF was defined as fatigue which occurred during the period of radiotherapy and there were no causes for the fatigue other than the radiotherapy. The FACIT-F questionnaire was answered before RT, at one week after the beginning of RT, at the end of RT and one month after the end of RT. We prescribed TJ-41 to the RIF patients during the radiotherapy. We defined as responders the patients who experienced improvements in RIF and hoped for further prescription.

Results: Fifty-two patients were enrolled for this study. RIF was observed in 24 (46 %) patients. On univariate analysis, the statistically significant predictor of RIF was the score of FACIT-F before RT. TJ-41 was administered to 9 patients and 8 of them (89 %) were responders.

Conclusion: RIF was common in breast cancer patients receiving post-operative RT and TJ-41 was effective for the RIF patients and improved their quality of life. However, these results may lack objectivity and the study was conducted with no placebo group. Improvement in objectivity of the assessment and a comparative study will be needed.

EP-1477

Radiotherapy-Hyperthermia: outcome/toxicity in the superficial recurrent/metastatic tumors

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Purpose or Objective: Hyperthermia is a powerful radiosensitizer for treatment of superficial tumors. Several trials showed an advantage of combining radiotherapy with hyperthermia in terms of both local tumor control and overall survival. The purpose of this study is to evaluate both efficacy and toxicity of radiotherapy-hyperthermia (RT-HT) in the treatment of superficial recurrent and metastatic tumors in patients previously or not previously irradiated.

Material and Methods: In our Institution twenty-three patients (mean age 71,4 years; range: 51-88) with histologically confirmed superficial recurrent/metastatic tumors were enrolled: 11 breast carcinoma, 6 head&neck cancer, 2 malignant melanoma, 2 sarcomas, 1 uterine adenocarcinoma and 1 hepatocarcinoma. Patients underwent radiotherapy treatment using 3D-conformal radiotherapy (8/23) or Helical Tomotherapy (15/23). External beam radiotherapy was delivered in 6-27 fractions of 1.8-5 Gy for a total dose of 20-57.5 Gy (mean external dose: 41 Gy). Prescribed dose was established taken into account, of the previous radiation doses, in previously irradiated patients, Karnofsky performance status and patient compliance. Hyperthermia treatment was performed with an electromagnetic superficial applicator operating at the frequency of 434 MHz. HT session was delivered once/twice weekly during the period of external radiotherapy, 1-2 hours after radiotherapy, to a mean total of 5 treatments [range: 1-9 sessions]. Termocouples were used to evaluate temperature distribution map. Average, maximum and minimum temperature parameters were recorded during hyperthermia treatment. The treatment goal was to reach 40- 42°C in > 90% (T90) of measured points for a duration of 60 minutes. Acute and late toxicity was evaluated according to the CTCAE criteria. Local control was assessed after the end of the treatment on the basis of the RECIST Criteria.

Results: During hyperthermia treatment the median temperature reached was 40.5 °C [range: 39 – 42.9°C]. During the radiotherapy in association with hyperthermia 2 pts (10%) had G3 toxicity and one of these interrupted the treatment. One pt had acute cutaneous toxicity ≥ G3 at 1 month. No pts had toxicity≥ G2 at 3 and 6 months. No toxicity was observed at 12 months. The mean follow-up was 10 months (range 3-22 months). Four pts (17%) had a complete response (CR), 11 pts (48%) had a partial response (PR),7 pts (30%) had a stable disease, (SD) and only 1 pt (4%) had progression disease (PD) and subsequently died. The Local control rate was 95%. Univariate analysis showed that Tmean,Tmax, Tmin,T90 parameters were not associated with local control rate.

Conclusion: Radio-hyperthermia can result in an effective approach, particularly in previously irradiated patients or in radio-resistant tumors. Our results show that Radio-Hyperthermia is an useful combined treatment with a good local control rate and a very high patient compliance.

EP-1478

Low Dose Radiation therapy of degenerative painful osteoarthritis

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Purpose or Objective: The purpose of this study is to evaluate the decrease in pain of patients treated with low-dose radiation therapy in osteoarthritis.

Material and Methods: From April 2015 to September 2015, 11 patients (10 female and 1 men) were treated with low dose radiotherapy for pain control. All patients were refractory to conventional therapy prior to irradiation.
13 joints (6 bursitis and 7 arthrosis): 4 trochanteritis, 5 knees, 1 left thumb rhizarthrosis, 2 metacarpophalangeal joint and 1 right epicondylitis were treated.
The median age was 69 years (range 46-89) with a median follow-up period of 3 months (range 0-6). Painful status was measured by visual analogue scale (VAS), with a median pre-treatment value of VAS= 7(range 4-9).
The radiotherapy dose of 6 Gy was delivered in 6 alternate days fractions of 1 Gy per fraction. In those patient with no pain relive post-treatment with VAS of or above 6 a second course of radiotherapy was proposed.
The second RT series started 8 weeks after the first RT series.

Results: The analysis was performed before the treatment and at the last follow-up. With a median VAS = 5 (range 0-8) 7 patients achieved pain relief, 3 patients underwent a second course of radiotherapy with identical dose, and 1 patient showed no change in pain. Daily requirements of analgesic were removed of reduced in 5 patients, subjective pain perception of response to irradiation evaluated at time of last visit regarding pre-treatment status was considered as “better” by 73% of patient. No patients presented acute or late complications attribute to radiation therapy.